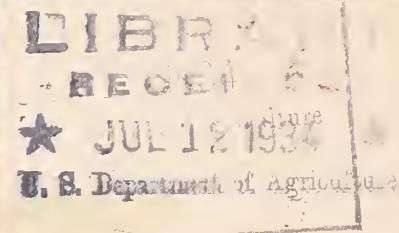


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United States Department of Agriculture
Bureau of Home Economics
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METHODS OF CANNING BEEF AND VEAL IN COMMUNITY CANNING PLANTS *

THE FOLLOWING DIRECTIONS for canning beef and veal have been prepared for use in connection with "A suggested plan for establishing meat canning plants for relief purposes", just issued by the Federal Emergency Relief Administration (June 1934). In connection with the canning directions, the Bureau of Home Economics re-emphasizes the following points:

Meat carcasses must be inspected by qualified meat inspection officials.

Special precautions must be taken to prevent contamination of the meat in handling.

Meat canning plants must be located at points where adequate refrigeration facilities are available, and --

Chilled meat must be canned promptly after leaving the refrigerator to avoid deterioration; therefore --

Deliveries of meat to the canning plant must be regulated to the rate of canning, so that each delivery may be canned at once; or,

If deliveries cannot be regulated, adequate refrigeration must be provided at the canning center.

Steps in the slaughtering and canning operations must be well coordinated and follow each other quickly.

Processing temperatures and processing times must be maintained absolutely according to authoritative directions.

These canning directions have been drawn up with reference to the emergency conditions now existing (June 1934) in the areas of drought, where new canning centers are being opened, new equipment is being assembled, and quick work is necessary to prevent the loss of a valuable meat supply. Hot weather and limited facilities intensify the problems always involved in canning a product so perishable as meat.

* Acknowledgment is made to the Extension Service of the Texas Agricultural and Mechanical College for suggestions and assistance in the preparation of these directions.

TO PREPARE meat for canning, cut as usual to remove meat from bones in the best way for canning, and as completely as possible. Methods of cutting beef and veal are described in Farmers' Bulletin No. 1415, entitled "Beef on the farm, slaughtering, cutting, and curing."

Roast cuts of beef are from round, rump, loins, prime rib, and the better parts of the chuck. Do not tie roast cuts together for processing, as this would interfere with heat penetration. Veal roasts are cut from leg, loin, rib and shoulder. Treat them in the same manner as beef.

When roast cuts are to be precooked in the can, cut the raw meat to fit the can. It is best to use two or more pieces of meat to each can. Filling the can with a single piece retards heat penetration. It is desirable to fill the cans in any one lot with pieces of about the same size.

If the roast meat is to be precooked in water or steam before packing into cans, cut it into pieces weighing about 1 pound each.

Stew Meat, from beef or veal, is made of the better portion (usually about one-third) of the remaining meat. This includes trimmings from the roasts and other good pieces free from connective tissue. Cut the meat into 1-inch cubes. Stew meat may include some fat. A small quantity of kidney fat may be added if the meat is quite lean.

Hamburger is made of the remaining portion of the beef not suitable for roast. Two lots may be ground, fine and coarse. Fine hamburger is made of lean meat free from connective tissue. Grind this through the 1/8-inch, or fine plate of the grinder. Coarse hamburger may contain a little connective tissue and fat. Grind it through the 5/8-inch or the big plate of the grinder.

Hash Meat is prepared from the meat (beef or veal) that is removed from the bones after they are cooked in the pressure cooker. Some canning centers have cooked bones for 60 minutes at 20 pounds pressure.

Saw the bones to pack well in the bone can which comes with the pressure cooker or retort. The yield of hash meat is about 8 to 10 cans per carcass. The canning of hash should not be allowed to interfere with the use of retorts for precooking or processing.

Fat. Any surplus fat should be rendered separately.

CANNING EQUIPMENT

For a complete list of canning equipment and detailed instructions for operation of a meat canning center, see "Suggestions for the establishing of meat canning plants for relief purposes." Issued by the Federal Emergency Relief Administration, June 1934.

Some points requiring special emphasis are mentioned here.

UTENSILS. Galvanized iron, which is used for table tops, lining of trucks, tubs, lug boxes, etc., contains a good deal of zinc. When cut surfaces of food lie in contact with galvanized iron they gradually absorb zinc, which in any considerable quantity is harmful. Do not allow meat to lie in contact with galvanized iron for more than 30 minutes.

Other canning utensils are made of retinned metal; of non-corrosive metals such as aluminum, monel, or Alleghany; of enameled ware; and of wood. Special care must be taken to keep wooden surfaces clean, or they may become infected with harmful bacteria. Scrub them with soapy water to remove all grease, and follow with scalding water or steam. Hypochlorite solutions are excellent for disinfecting wooden surfaces used for meat.

Avoid copper utensils. They discolor meat.

CANS. Use plain No. 2 tin cans. Wash the cans in soapy water, rinse, and drain. It is not necessary to sterilize the cans. Wipe the lids with a damp cloth, and keep the sealing composition dry. The net weight for meat products in these cans is 20 ounces.

RETORTS need special care in handling. Follow instructions of the manufacturers in all details, including the time for venting, which may vary with the size of the retort.

Do not count time until the steam pressure holds steadily on the point designated in the instructions.

Check the pressure gauges on used retorts by comparison with a master gauge when this is possible.

Correct for altitude by adding 1 pound pressure for each 2,000 feet above sea level.

Where bones or cold cans are placed in the retorts, the difference in temperature causes the steam to condense and form excessive water in the bottom of the retort. Drain this water from each retort after the pressure is up. It cannot be drained off successfully if other drain valves on other retorts in a chain are open.

EXHAUST BOXES. Meats are preheated before the cans are sealed. Methods of preheating are given below. Seal the cans when an initial temperature of 170° Fahrenheit (77° Centigrade) is reached at the centers of the cans. If the sealing cannot be done at once, use an exhaust box leading up to a sealer. This will prevent cooling, and insure a good vacuum in the finished product.

Such an exhaust box can be built quite inexpensively when steam under low pressure is available. It may consist of a metal chute about 30 to 40 feet long fitted with one or two rotating chains or belts which carry the cans through. Steam inlets are placed along the sides. The waste water may be disposed of by inclining the chute. Controls are needed for starting or stopping the chains at any time. It is desirable, also, to be able to regulate the speed of the chains, making it correspond to the speed of the sealers.

SEALERS. To determine whether the contents of cans are hot enough for sealing use either of two tests:

- a. Insert a thermometer to the center of the contents. It should read not less than 170° Fahrenheit (77° Centigrade).
- b. If no thermometer is available, seal the cans when the meat is steaming hot, and ~~very little~~ ^{none} of the red color of the raw meat left.

When meats are precooked in a retort, examine a few cans from the center of each tier to make certain that the meat has been sufficiently heated.

Cans should have 3/8 to 1/2 inch headspace when sealed.

Check sealers at the beginning of each shift. Oil at the beginning of each shift. A heavy oil should be used in the gear box of electric sealers.

Process the hot cans of meat immediately after sealing. If they must stand a short time, put them where they will remain hot, as in an open retort or steamer.

CODING

Each lot of canned meat should be coded before processing; i.e., each can is stamped with code marks which identify it as belonging to a given lot, of a given kind, on a given date. Coding makes it possible after canning to trace the cans of any lot in which spoilage occurs. The cold lids may be stamped before sealing.

Use a rubber stamp and stamp pad of canners' ink (1 for each 2 sealers) to mark the tops of the cans with a code before processing.

Code for marking:

RC - Roast cuts	H - Hash meat
S - Stew meat	L - Liver
HC - Hamburger Coarse	T - Tongue (or similar marking for other edible organs)
HF - Hamburger Fine	
	SS - Soup Stock

Example: "RC - 6 - 20 - 34" means "Roast cuts, canned June 20, 1934."

CANNING METHODS

ROAST CUTS. Two methods of canning roasts of beef or veal are described below. Meat canned by Method 1 has a better flavor than that canned by Method 2, and the broth in the first case is undiluted meat juice. Canning centers in Texas during December 1933 used Method 1 for large quantities of roast cuts. Where enough retorts are not available for both pre-cooking and processing, Method 2 may save time.

Method 1. Fill each can with two or more pieces of raw meat which have been cut to fit the can. Weighing of the raw meat in the cans is not necessary. Place the cans in a retort in alternating positions so that no can is directly above another. Cover the top tier with a circular metal plate for protection. Close retort, vent or exhaust air as in processing by allowing steam to emerge before shutting off the petcock. Cook 15 to 20 minutes at 240° F., or 10 pounds pressure. Allow steam to escape gradually. Remove cans and test some center cans of each tier to make certain of sufficient cooking. Use either method described under "Scalers" for these tests.

Weigh the cans and for any below 20 ounces net (allowing an average weight for the empty cans) add hot meat or juice from other cans to bring up required weights. In some cases it may be necessary to pour off excess juice. Add 3/4 to 1 teaspoon of salt to each can. Put through exhaust box, seal, stamp, and process 55 minutes at 250° F., or 15 pounds pressure. Cool immediately.

Method 2. For this method, cut the meat in pieces weighing about one pound each. Place these pieces in just enough boiling water to cover. Do not allow the temperature to again come to boiling, but cook at simmering temperatures (around 196° F.) for about 30 minutes. This should shrink the meat to about two-thirds of its original volume, and leave no red color inside the pieces. Pack at once, cutting the meat as necessary to fill the cans. Add boiling hot concentrated broth to cover, and 3/4 to 1 teaspoon of salt to each can. Exhaust, seal, and stamp. Process 60 minutes at 250° F., or 15 pounds pressure. Cool immediately.

STEW MEAT. Cut the meat into one-inch cubes, add these to a small quantity of boiling broth, and simmer until shrunken and thoroughly heated through. Stir occasionally to prevent sticking. Fill cans with drained meat, and cover with boiling hot concentrated broth. Add 3/4 to 1 teaspoon of salt to each can. Exhaust, seal, stamp, and process 50 minutes at 250° F., or 15 pounds pressure. Cool immediately.

HAMBURGER, FINE. Grind with a 1/8-inch plate. For each 24 pounds of meat, add 1 cup salt and mix. Pack cold into cans. Precook by placing the open cans in a retort as described under Method 1 for roast cuts. Test cans as described under sealing to see that meat in centers of cans has been heated through. Exhaust, seal, stamp, and process 50 minutes at 250° F., or 15 pounds pressure. Cool immediately.

If the precocking of fine hamburger interferes with the use of retorts for processing, it should be discontinued.

HAMBURGER, COARSE. Grind with a 5/8-inch plate, which will give pieces about the size of dried navy beans. Such meat may be used later for Chili con carne. Add meat slowly to boiling broth and then simmer until the color change indicates the cooked stage. Fill the cans with drained meat using a wooden mallet to pack with if necessary. Cover with boiling hot concentrated broth, and add 3/4 to 1 teaspoon of salt to each can. Exhaust, seal, stamp and process 50 minutes at 250° F., or 15 pounds pressure. Cool immediately.

HASH MEAT. Remove cooked meat from bones after steaming. Cut into size suitable for hash, about 1-inch lengths. Heat thoroughly in a limited quantity of concentrated broth. Fill cans with drained meat, cover with boiling hot concentrated broth, and add 3/4 to 1 teaspoon of salt to each can. Exhaust, seal, stamp and process 50 minutes at 250° F., or 15 pounds pressure. Cool immediately.

LIVER. Cut into large pieces and heat thoroughly in just enough soup stock to cover. Fill cans with drained liver and cover with boiling hot broth in which it was heated. Add 3/4 to 1 teaspoon of salt to each can. Exhaust, seal, stamp and process 50 minutes at 250° F., or 15 pounds pressure. Cool immediately.

TONGUE. Boil until skin can be removed. Skin, pack into cans, and cover with boiling hot concentrated broth. Add salt as for other products. Exhaust, seal, stamp and process 50 minutes at 250° F., or 15 pounds pressure. Cool immediately.

Soup STOCK. Concentrate by boiling down, and clarify by straining. Add 1% salt by weight. Fill cans with boiling hot broth, seal, stamp, and process 40 minutes at 250° F., or 15 pounds pressure. Cool immediately.

SWEETBREADS, or thymus glands of veal. Precook by simmering in a small quantity of salted water or broth. Pack into cans, cover with broth, add 3/4 teaspoon salt, and seal at once. Process 50 minutes at 250° F., or 15 pounds pressure. Cool immediately.

Cooling

Open the petcock gradually at the end of the processing period. Place the cans in running water to cool. They should remain in the water until no longer hot to touch. To finish cooling, place on tables or shelves so that air will circulate around each can. When thoroughly cool they should be tested for leaky seals, labeled and stacked in rows which will permit the circulation of some air. Any leaky seals should be detected as soon as possible after the original processing. The contents of such cans must either be transferred to new cans and reprocessed within 6 hours, or destroyed.

Final Inspection and Labeling

After processing, hold all cans at room temperature for 10 days for final examination. Then remove all defective cans, such as leakers and swellers, which must be destroyed.

Use wrap-around paper labels, which are held on the cans by wrapping one glued end over the other. The labels should show (1) name of organization and location of packers, (2) nature of contents, (3) net weight, (4) month and year of packing, (5) "State inspected and passed", and in prominent and legible print: "Not to be sold. Distributed by the Federal Emergency Relief Administration."

CAUTIONS

Spoilage in canned meats is due chiefly to five causes, namely:

1. Contamination of the meat before canning.
2. Delay at any stage in the canning procedure.
3. Initial temperature (at center of can) too low at time of sealing.
4. Insufficient processing, especially as to time and temperature.
5. Leaky seals.

EVERY POSSIBLE PRECAUTION SHOULD BE TAKEN ON EACH OF THESE POINTS.

